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EXAMINER
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/564,715	HEUSCHER, DOMINIC J.
	Examiner	Art Unit	
	Anthony Cochran	2112	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2006*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9, 12-20, 24-29, and 31* is/are rejected.

7)☒ Claim(s) *10,11, 21-23 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date *13 January 2006*.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____ .

Detailed Action

Specification

The disclosure is objected to because there are no section headings in the specification.

Note the following guidelines below. Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
        (1) Field of the Invention.
        (2) Description of Related Art including information disclosed under 37
        CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 31 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 31 is directed toward a computed implemented method involving computational data. Though the values calculated are based on physical properties, the values are none-the-less generated within a computer without a physical manifestation. Thus, these claims do not produce a result which meet the standard of being concrete, tangible, and useful.

The claims must be for a practical application of the abstract idea, law of nature, or natural phenomenon. See Diehr, 450 U.S. at 187, 209 USPQ at 8 ("application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection") and Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").

To satisfy section 101 requirements, the claim must be for a practical application of the 101 judicial exception, which can be identified in various ways:

1) The claimed invention "transforms" an article of physical object to a different state or thing.

2) The claimed invention otherwise produces a useful, concrete, and tangible result, based on the factors discussed in MPEP 2106. See also: http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf.

An imaging method including reconstructing voxels based on the first and second radiation projection data, the reconstructing including smoothing projection data of

voxels in a transition region between the central region and the surrounding region is performed by the computer implementing programs and is therefore nonstatutory subject matter. Manipulation of values does not include a physical transformation outside of a computer or representation thereof. A process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter, is not deemed to be concrete, tangible, and useful, and is therefore non-statutory.

An example, which would make the instant method steps statutory, would be to include a step of displaying the reconstructed voxels. Hence, the data would become concrete, tangible, and useful.

The Examiner has examined the claims as best understood as follows.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

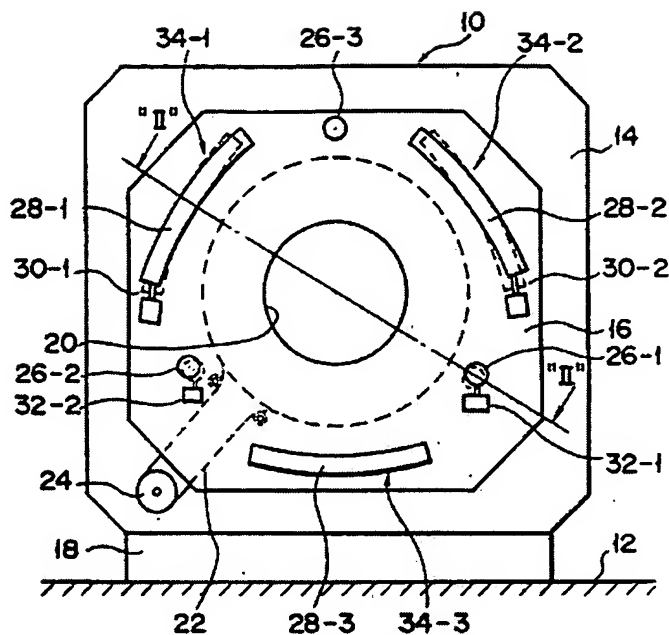**Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by **Mori et al. (US Patent 5,311,428)**.

F I G. 1

With respect to **claim 1,** Mori discloses computed tomography imaging system including: a rotating gantry (**16**) defining an examination region; a first radiation source disposed on the rotating gantry and arranged to emit first radiation into the examination region (**26-1**); a second radiation source disposed on the rotating gantry and arranged to emit second radiation into the examination region (**26-2**), the second radiation source being angularly spaced around the gantry from the first radiation source (**Fig. 1**); a first radiation detector arranged to receive the first radiation (**28-1**), a center of the first radiation detector being angularly spaced around the gantry from the first radiation source by less than 180 degrees (**asymmetrical option via shift mechanism 30-1**); a second radiation detector arranged to receive the second radiation (**28-2**), a center of the second radiation detector being angularly spaced around the gantry from the second radiation source by less than 180 degrees (asymmetrical option via shift mechanism 30-1); and a reconstruction processor (**40**) that reconstructs projection data

acquired during gantry rotation by the first and second radiation detectors into one or

more image representations (**col 4 lines 9-17**).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-5, 19, 20, 24-27 are rejected under 35 U.S.C. 103(a) as being

unpatentable over **Mori** as applied to **claim 1** in view of **Karellas et al. (US Patent**
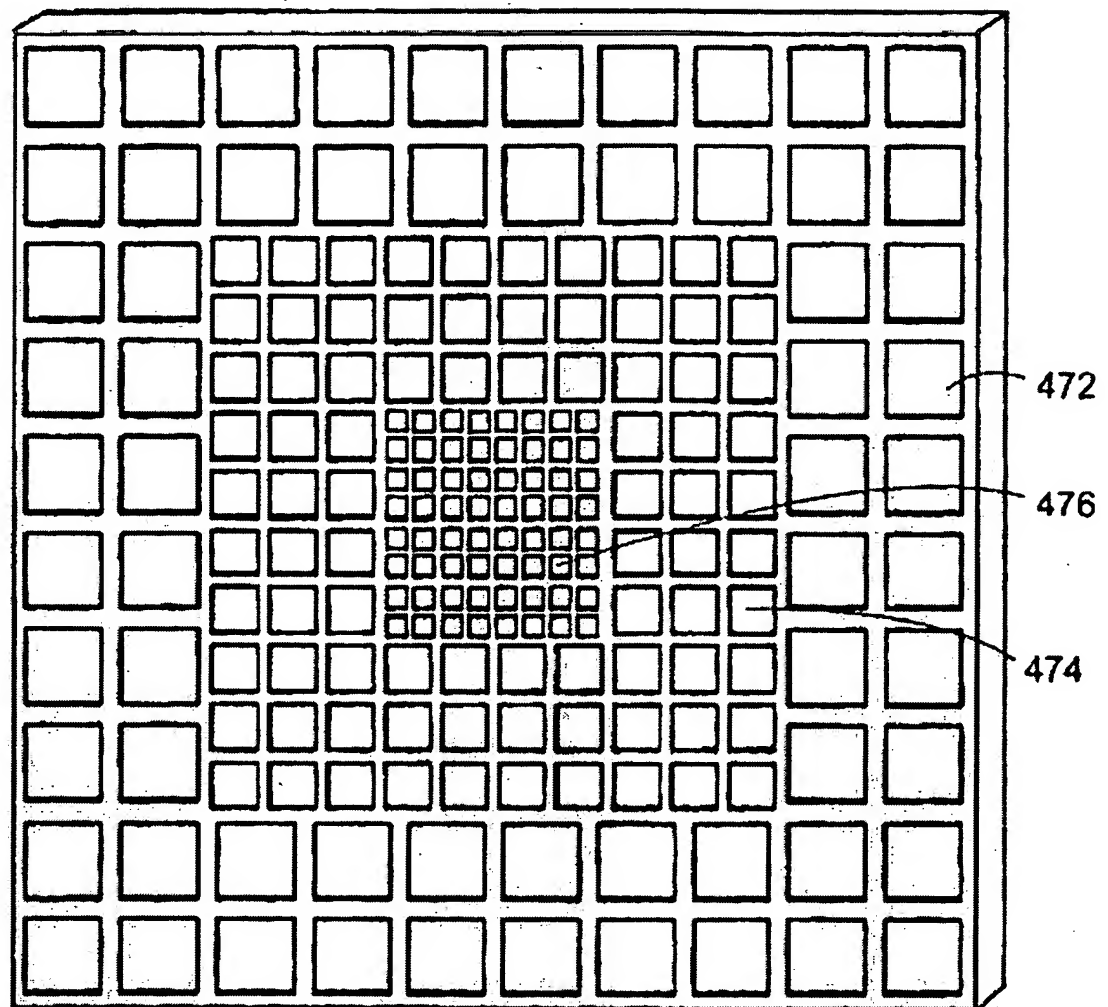
6895077 B2).

Figure 10H

With respect to **claims 2, Mori** teaches the computed tomography imaging system as set forth in **claim 1**.

Mori fails to teach wherein the first radiation detector includes: a high resolution portion having detector elements of a first size; and a low resolution portion having detector elements of a second size, the second size being larger than the first size

wherein the high resolution portions of the first and second radiation detectors are arranged angularly between the low resolution portions of the first and second radiation detectors on the rotating gantry further including: a non stationary filter that smoothes a transition between projection data acquired by the low resolution portions of the first and second radiation detector arrays and projection data acquired by the high resolution portions of the first and second radiation detector arrays.

Karellas et al. teaches wherein the first radiation detector includes: a high resolution portion having detector elements of a first size; and a low resolution portion having detector elements of a second size, the second size being larger than the first size (**figs 10C, 10E, 10F and 10H**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include a high resolution portion having detector elements of a first size; and a low resolution portion having detector elements of a second size of **Karellas et al.**, since a person would have been motivated to achieve higher spatial resolution in the central section while maintaining a high signal-to-noise ratio in the non-central region (**col 18, lines 47-50**) as explicitly stated by Karellas **et al.**

With respect to **claim 3, 24, and 25, Mori** teaches the computed tomography imaging system as set forth in **claim 2.**

Mori fails to teach wherein the second radiation detector includes: a high resolution portion having detector elements of the first size; and a low resolution portion

having detector elements of the second size; wherein the high resolution portions of the first and second radiation detectors are arranged angularly between the low resolution portions of the first and second radiation detectors on the rotating gantry.

Karellas et al. teaches wherein the second radiation detector includes: a high resolution portion having detector elements of the first size; and a low resolution portion having detector elements of the second size (**Fig 10E and 10F**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include the second radiation detector to include a high resolution portion having detector elements of the first size; and a low resolution portion having detector elements of the second size of Karellas **et al.**, since a person would have been motivated to achieve higher spatial resolution in the central section while maintaining a high signal-to-noise ratio in the non-central region (**col 18, lines 47-50**) as explicitly stated by Karellas **et al.**

With further respect to **claim 3, Mori fails to teach** wherein the high resolution portions of the first and second radiation detectors are arranged angularly between the low resolution portions of the first and second radiation detectors on the rotating gantry.

Karellas et al. teaches wherein the high resolution portions of the first and second radiation detectors are arranged angularly between the low resolution portions of the first and second radiation detectors (Fig 10C) on the rotating gantry.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include wherein the high resolution portions of the first and second radiation detectors are arranged angularly between the

low resolution portions of the first and second radiation detectors of **Karellas et al.**, since a person would have been motivated to gain the option of interpolation techniques for the detector (CCD) seams at different resolutions (**col 19, line 36**) as explicitly stated by Karellas **et al.**

SENSOR 1
422

SENSOR 2
424

HIGHER
RESOLUTION
PIXELS
432

LOWER
RESOLUTION
PIXELS
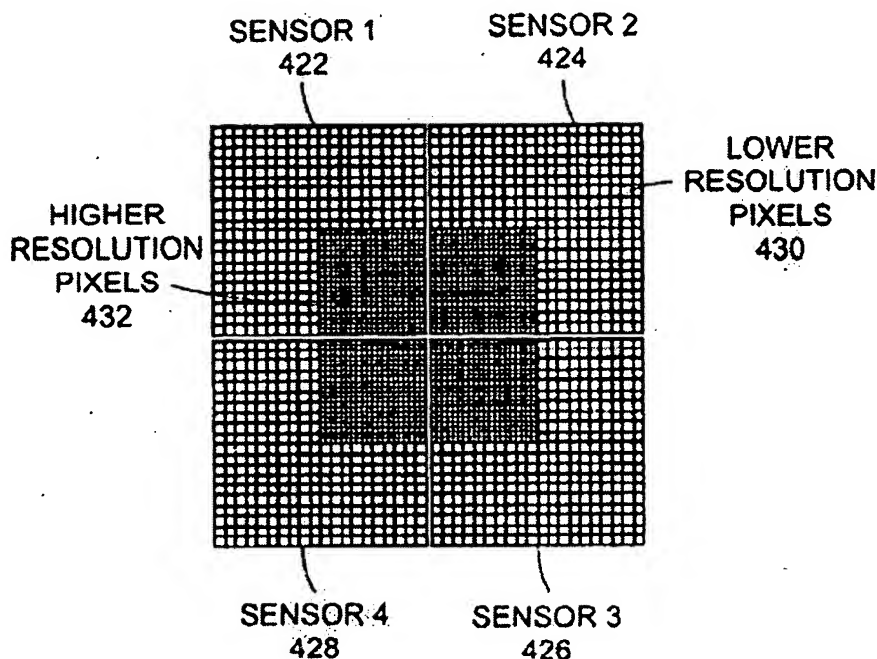430

SENSOR 4
428

SENSOR 3
426

Figure 10C

With respect to **claim 4, Mori** teaches the computed tomography imaging system as set forth in claim 3.

Mori fails to teach a non stationary filter that smoothes a transition between projection data acquired by the low resolution portions of the first and second radiation detector arrays and projection data acquired by the high resolution portions of the first and second radiation detector arrays.

Karellas et al. teaches a non stationary filter (Fig 8 item 278) that smoothes a
transition between projection data acquired by the low resolution portions of the first and
second radiation detector arrays and projection data acquired by the high resolution
portions of the first and second radiation detector arrays.

It would have been obvious to one of ordinary skill in the art at the time the
invention was made to modify the system of Mori to include the non stationary filter
of Karellas et al., since a person would have been motivated to derive energy
information of the x-ray beam incident on the patient (col 14, lines 65) as explicitly
stated by Karellas et al.

With respect to claim 5, Mori in view of Karellas et al. discloses the claimed
invention as set fort in claim 2 except for wherein the high resolution portion of the first
radiation detector is arranged to receive the symmetric beam component; and the low
resolution portion of the first radiation detector is arranged to receive the asymmetric
beam component.

It would have been obvious to one of ordinary skill in the art at the time the
invention was made to arrange the high resolution portion of the first radiation detector
to receive the symmetric beam component; and the low resolution portion of the first
radiation detector to receive the asymmetric beam component, since it has been held
that rearranging parts of an invention involves only routine skill in the art. In re.
Japikse, 86 USPQ 70.

With respect to **claims 19 and 20,** Mori further teaches a reconstruction processor that reconstructs projection data acquired during gantry rotation by at least the first radiation detector array into an image representation **(FRU fast reconstruction unit item 30 fig. 3).**

With respect to **claims 26, Mori** teaches a computed tomography imaging method including: passing first radiation through an examination region **(fig. 3 item 26-1)** examination region including a central region and a surrounding region; measuring central projections corresponding to rays of first radiation that intersect the central region **(figure. 3 central region 54),** and reconstructing the central projections and the surrounding projections to generate a reconstructed image representation **(FRU item 40).**

Mori fails to teach the measuring using a first high resolution detector array that has a first spacing of detector elements; measuring surrounding projections corresponding to rays of first radiation that intersect the surrounding region without intersecting the central region, the measuring using a first low resolution detector array that has a second spacing of detector elements, the second spacing being larger than the first spacing.

Karellas et al. teaches the measuring using a first high resolution detector array that has a first spacing of detector elements; measuring surrounding projections corresponding to rays of first radiation that intersect the surrounding region without intersecting the central region, the measuring using a first low resolution detector array

that has a second spacing of detector elements, the second spacing being larger than the first spacing; **(figs 10C, 10E, 10F and 10H)**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include a high resolution portion having detector elements of a first size; and a low resolution portion having detector elements of a second size of **Karellas et al.**, since a person would have been motivated to achieve higher spatial resolution in the central section while maintaining a high signal-to-noise ratio in the non-central region **(col 18, lines 47-50)** as explicitly stated by **Karellas et al.**

With respect to **claims 27, Mori** teaches The method as set forth in claim 26, further including: passing second radiation (26-2) through the examination region; measuring central projections corresponding to rays of second radiation that intersect the central region,

Mori fails to teach the measuring using a second high resolution detector array that has the first spacing of detector elements; measuring surrounding projections corresponding to rays of second radiation that intersect the surrounding region without intersecting the central region, the measuring using a second low resolution detector array that has the second spacing of detector elements.

Karellas et al. teaches the measuring using a second high resolution detector array that has the first spacing of detector elements **(fig. 10C and 10H)**; measuring surrounding projections corresponding to rays of second radiation that intersect the

surrounding region without intersecting the central region, the measuring using a second low resolution detector array that has the second spacing of detector elements. **(figs 10C, 10E, 10F and 10H)**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include a high resolution portion having detector elements of a first size; and a low resolution portion having detector elements of a second size of **Karellas et al.**, since a person would have been motivated to achieve higher spatial resolution in the central section while maintaining a high signal-to-noise ratio in the non-central region of the second radiation system **(col 18, lines 47-50)** as explicitly stated by **Karellas et al.**

Claims **6 is** rejected under 35 U.S.C. 103(a) as being unpatentable over **Mori** as applied to **claim 1** above, and further in view of **Crawford et al. (US Patent US 4636952 A)**.

With respect to **claim 6, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach wherein the first and second radiation detectors each span greater than 90 degrees around the gantry.

Crawford et al. teaches a radiation detector spanning greater than 90 degrees **(fig. 4 below)** around the gantry.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include one or more detectors of

Crawford et al., since a person would have been motivated to provide a means for a

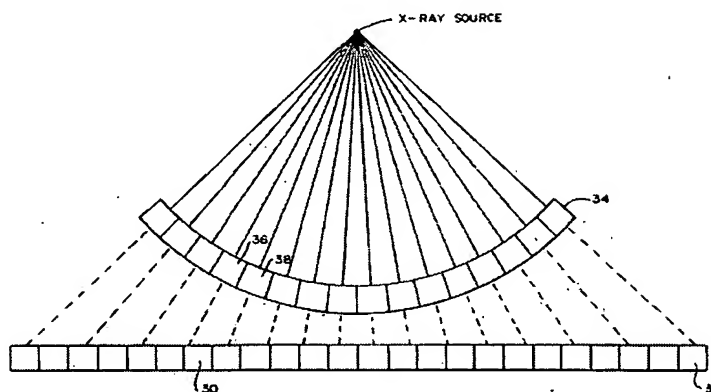larger field of view (FOV) for scanning large objects.

FIG.— 4

Claims 7, 9, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Mori as applied to **claim 1** above, and further in view of **Swerdloff et al. (US Patent US**

US 5724400 A).

With respect to **claim 7, Mori** teaches the computed tomography imaging system
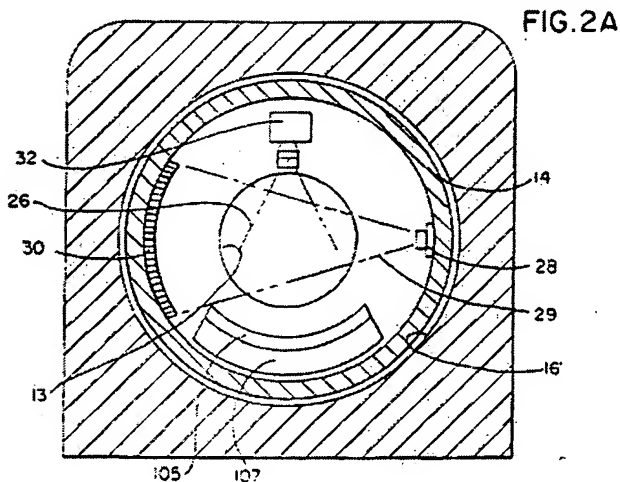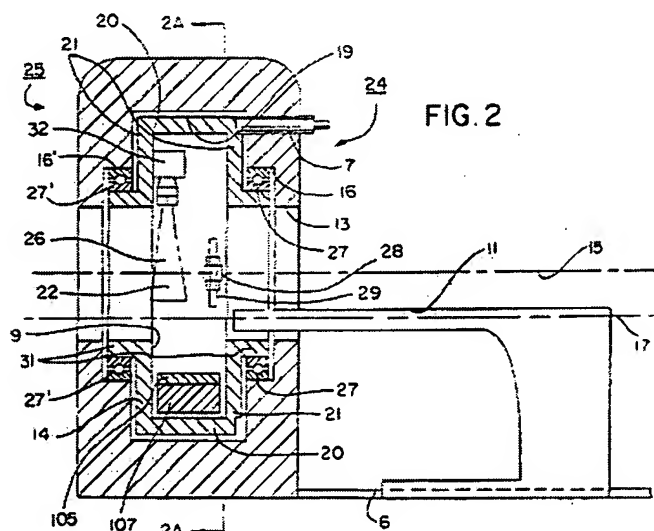
as set forth in claim 1.

Mori fails to teach wherein the second radiation source is angularly spaced from

the first radiation source by 90 degrees.

Swerdloff et al. teaches wherein the second radiation source is angularly

spaced from the first radiation source by 90 degrees (fig 2A and col 5 line 47 ; beams at

right angles)

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify the system of **Mori** to include one or more detectors of

Swerdloff et al., since a person would have been motivated to prevent unwanted

signals from the two systems (**col 5 line 50**) as explicitly stated by **Swerdloff et al.**

FIG. 2

FIG.2A

With respect to **claim 9, Mori** teaches the computed tomography imaging system

as set forth in claim 1.

Mori fails to teach wherein the first and second radiation sources lie in a plane

parallel to a plane of gantry rotation.

Swerdloff et al. teaches wherein the first and second radiation sources lie in a plane parallel to a plane of gantry rotation (fig 2 items 28 and 32 both rotate in planes parallel to the gantry).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include one or more detectors of **Swerdloff et al.**, since a person would have been motivated to prevent unwanted signals from the two systems (**col 5 line 50**) as explicitly stated by **Swerdloff et al.**

With respect to **claim 16, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach further including: a radiation source control that alternates between generating radiation by the first radiation source and generating radiation by the second radiation source such that the first and second radiation sources are not simultaneously generating radiation.

Swerdloff et al. teaches further including: a radiation source control that alternates between generating radiation by the first radiation source and generating radiation by the second radiation source such that the first and second radiation sources are not simultaneously generating radiation (**fig. 6 separate radiation controls 60 and 67 controlled by computer 61 can be programmed to alternate generating radiation**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include a radiation source control

that alternates between generating radiation by the first radiation source and generating radiation by the second radiation source such that the first and second radiation sources are not simultaneously generating radiation of **Swerdloff et al.**, since a person would have been motivated to have a dual system for imaging and therapy that can operate individually or simultaneously as implied in **Swerdloff et al.**

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Mori** as applied to **claim 1** in view of **Swerdloff et al. (US Patent US US 5724400 A)** in further view of **Crawford et al. (US Patent US 4636952 A)**.

With respect to **claim 8, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach wherein the second radiation source is angularly spaced from the first radiation source by at least 90 degrees, and each of the first and second radiation detectors spans greater than 90 degree around the gantry.

Swerdloff et al. teaches that the second radiation source is angularly spaced from the first radiation source by at least 90 degrees (fig 2A and col 5 line 47)

Crawford et al. teaches a radiation detector spanning greater than 90 degrees **(fig. 4)** around the gantry.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include one or more detectors of **Crawford et al.**, since a person would have been motivated to provide a means for a larger field of view (FOV) for scanning large objects.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include the second radiation source is angularly spaced from the first radiation source by at least 90 degrees as taught by **Swerdloff et al.** and a radiation detector spanning greater than 90 degrees around the gantry as taught by **Crawford et al.** into the system of **Mori**.

Claim 12, 14, 15, 17, 18 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mori** as applied to **claim 1** in view of **Eisenberg et al. (US 20030128801 A1).**

With respect to **claim 12, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach wherein the first and second radiation sources are conebeam radiation sources, and the first and second radiation detectors are two dimensional arrays, the computed tomography imaging system further including: a support element for supporting an associated imaging subject in the examination region, the support element being linearly movable in an axial direction, simultaneous gantry rotation and axial motion of the support element effecting a helical orbit of the first and second radiation sources relative to the associated imaging subject during acquisition of the projection data.

Eisenberg et al. teaches multiple radiation sources are conebeam radiation sources, and the first and second radiation detectors are two dimensional arrays **(fig.**

4), the computed tomography imaging system further including: a support element for supporting an associated imaging subject in the examination region (**fig 13 item 22**), the support element being linearly movable in an axial direction, simultaneous gantry rotation and axial motion of the support element effecting a helical orbit of the first and second radiation sources relative to the associated imaging subject during acquisition of the projection data (**fig 24**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include multiple radiation sources that are conebeam radiation sources, and the detectors are two dimensional arrays, the support element for supporting an associated imaging subject in the examination region, the support element being linearly movable in an axial direction, simultaneous gantry rotation and axial motion of the support element effecting a helical orbit of the radiation sources relative to the associated imaging subject during acquisition of the projection data of **Eisenberg et al.**, since a person would have been motivated to provide faster data acquisition times for whole body patient imaging and to compensate for missing projection rays in step and shoot imaging with wide-angle cone beam three-dimensional computed tomography (**[0108]**) as explicitly stated by **Eisenberg et al.**

With respect to **claim 14, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach wherein the first radiation detector includes a first anti scatter grid focused on the first radiation source; and the second radiation detector includes a second anti scatter grid focused on the second radiation source.

Eisenberg et al. the first radiation detector includes a first anti scatter grid focused on the first radiation source; and the second radiation detector includes a second anti scatter grid focused on the second radiation source (**fig 11a item 92 for the multi modality system of fig 2**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include that the first radiation detector includes a first anti scatter grid focused on the first radiation source; and the second radiation detector includes a second anti scatter grid focused on the second radiation source of **Eisenberg et al.**, since a person would have been motivated to reduce Compton scattered x-ray radiation for angles not in direct alignment with the x-ray focal spot to detector pixel arrangement ([0083)]) as explicitly stated by **Eisenberg et al.**

With respect to **claim 15, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach wherein a first radiation energy of the first radiation is different from a second radiation energy of the second radiation; and the reconstruction processor reconstructs projection data acquired by the first and second radiation detector arrays into one or more combined image representations having contributions from projection data acquired by the first and second radiation detector arrays.

Eisenberg et al. teaches a first radiation energy of the first radiation is different from a second radiation energy of the second radiation (**[0060]; system 52 causes generation of x-rays at different energies for from the sources 24**)); and the

reconstruction processor **(fig. 3 item 62)** reconstructs projection data acquired by the first and second radiation detector arrays into one or more combined image representations having contributions from projection data acquired by the first and second radiation detector arrays (**[0061]; raw data management system fig. 3 item 60**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include a first radiation energy of the first radiation is different from a second radiation energy of the second radiation; and the reconstruction processor reconstructs projection data acquired by the first and second radiation detector arrays into one or more combined image representations having contributions from projection data acquired by the first and second radiation detector arrays of **Eisenberg et al.**, since a person would have been motivated to have a multi-modality imaging system and multi-modality fused imaging (**[0056]**) as explicitly stated by **Eisenberg et al.**

With respect to **claim 17 and 31, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach wherein the reconstruction processor includes: a backprojector; and a weighting processor that applies a weighting function to projection data prior to backprojecting, the weighting processor applying a first weighting function to projection data for reconstruction of voxels in a central region of the examination region, the weighting processor applying a second weighting function for reconstruction

of voxels outside the central region, the second weighting function being dependent upon a distance of the voxel from the center of rotation.

Eisenberg et al. teaches wherein the reconstruction processor includes: a backprojector; **(fig. 30 item 188)** and a weighting processor that applies a weighting function **[0109]** to projection data prior to backprojecting, the weighting processor applying a first weighting function to projection data for reconstruction of voxels in a central region of the examination region, the weighting processor applying a second weighting function for reconstruction of voxels outside the central region, the second weighting function being dependent upon a distance of the voxel (pixels having a finite thickness in this case) from the center of rotation **(fig 9f and [0081])**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include the reconstruction processor includes: a backprojector; and a weighting processor that applies a weighting function to projection data prior to backprojecting with the weighting processor applying a first weighting function to projection data for reconstruction of voxels in a central region of the examination region, the weighting processor applying a second weighting function for reconstruction of voxels outside the central region, the second weighting function being dependent upon a distance of the voxel from the center of rotation of **Eisenberg et al.**, since a person would have been motivated to change the effective x-ray optical response of the system **([0081] and figs. 9c-e)** as explicitly shown by **Eisenberg et al.**

With respect to **claim 18, Mori** teaches the computed tomography imaging system as set forth in claim 1.

Mori fails to teach a first asymmetrically adjustable collimator for adjusting an edge of the first radiation; and a second asymmetrically adjustable collimator for adjusting an edge of the second radiation.

Eisenberg et al. teaches first asymmetrically adjustable collimator (fig 9f) for adjusting an edge of the first radiation; and a second asymmetrically adjustable collimator for adjusting an edge of the second radiation (**[0012] collimators for each source**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include further including: a first asymmetrically adjustable collimator for adjusting an edge of the first radiation; and a second asymmetrically adjustable collimator for adjusting an edge of the second radiation of **Eisenberg et al.**, since a person would have been motivated to cover the desired data acquisition area (**[0069]**) as stated in **Eisenberg et al.**

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Mori** as applied to **claim 1** in view of **Eisenberg et al.** as applied to **claim 12** in further view of **Swerdloff et al.**

With respect to **claim 13, Mori** teaches the computed tomography imaging system as set forth in claim 1, and **Eisenberg et al.** teaches the computed tomography imaging system as set forth in claim 12.

Mori and **Eisenberg et al.** fail to teach wherein the first and second radiation sources are relatively offset in the axial direction by an amount such that the second radiation source follows the first radiation source along the helical orbit.

Swerdloff et al. teaches wherein the first and second radiation sources are relatively offset in the axial direction (**fig 2 above**) by an amount such that the second radiation source follows the first radiation source along the helical orbit (**col 3 line 1**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** and **Eisenberg et al.** to include first and second radiation sources are relatively offset in the axial direction (**fig 2 above**) by an amount such that the second radiation source follows the first radiation source along the helical orbit of **Swerdloff et al.**, since a person would have been motivated to improve the speed of treatment by eliminating the need to accelerate and decelerate (**col 1 line 7**) as explicitly stated by **Swerdloff et al.**

Claim 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mori** in view of **Karellas et al.** as applied to **claim 27,** in further view of **Eisenberg et al.**

With respect to **claim 28, Mori** and **Karellas et al.** teach the method as set forth in claim 27.

Mori and **Karellas et al.** fail to teach wherein the first radiation is substantially monochromatic at a first energy and the second radiation is substantially

monochromatic at a second energy that is different from the first energy, and the reconstructing includes: reconstructing the central projections measured using the first high resolution detector array and the surrounding projections measured using the first low resolution detector array to generate a first reconstructed image representation; and reconstructing the central projections measured using the second high resolution detector array and the surrounding projections measured using the second low resolution detector array to generate a second reconstructed image representation

Karellas et al. wherein the first radiation is substantially monochromatic **(col 22 line 15)**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include the monochromatic beams of **Karellas et al.**, since a person would have been motivated to provide a means for simplicity and optimization (**col 2 line 17**) as stated by **Karellas et al.**

Eisenberg et al. teaches a first energy and the second radiation is at a second energy that is different from the first energy (**[0060]; system 52 causes generation of x-rays at different energies for from the sources 24**), and the reconstructing includes: reconstructing the central projections measured using the first high resolution detector array and the surrounding projections measured using the first low resolution detector array to generate a first reconstructed image representation; and reconstructing the central projections measured using the second high resolution detector array and the surrounding projections measured using the second low

resolution detector array to generate a second reconstructed image representation ((**fig. 3 imaging system**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of **Mori** to include a first energy and the second radiation is at a second energy that is different from the first energy, and the reconstructing includes: reconstructing the central projections measured using the first high resolution detector array and the surrounding projections measured using the first low resolution detector array to generate a first reconstructed image representation; and reconstructing the central projections measured using the second high resolution detector array and the surrounding projections measured using the second low resolution detector array to generate a second reconstructed image representation of **Eisenberg et al.**, since a person would have been motivated to have a multi-modality imaging system and multi-modality fused imaging ([0056]) as explicitly stated by **Eisenberg et al.**

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include the monochromatic beams as taught by **Karellas et al.** and a multi-modality imaging system as taught by **Eisenberg et al.** into the system of **Mori**.

With respect to **claim 29, Mori** teaches the method as set forth in claim 27, wherein the passing of the first radiation and the passing of the second radiation do not overlap temporally (fig.3 separate controller channels) .

Claim Objections

Claims 10,11, 21-23 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
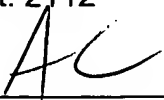
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Cochran whose telephone number is (571) 272-9794. The examiner can normally be reached on Monday - Thursday from 8:00am to 6:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah, can be reached on (571) 272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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